

Protective Action Recommendations

For a

Radiological Dispersal Event

Revision 6

Working Group

Debra McBaugh, DOH

Craig Lawrence, DOH

Kristen Schwab, DOH

Dick Cowley, DOH

Jerry Leitch, USEPA-Retired

Rick Poeton, USEPA



Table of Contents

	Page
Purpose.....	2
Introduction.....	2
Protective Action Recommendations (PAR)	3
Phase I.....	3
Phase II.....	4
Public Recommendations.....	4
Recommendations to Local Governments/First Responders.....	5
References.....	8
Contacts.....	9

Purpose

With the current concern that a radiological event of large magnitude could occur at a location that does not routinely deal with radioactive material, recommendations for the protective actions to be taken must be developed and distributed long before the event happens. To this end, the Department of Health set up a working group consisting of staff from the Department and from the U.S. Environmental Protection Agency. The purpose was to create guidelines for protective actions that would be appropriate for nearly any expected scenario. The guidelines will be distributed to response agencies and held for wider distribution should an event occur. Three phases of the event were identified. This document addresses Protective Action Recommendations (PAR) for two of those phases. The first set of PARs apply when there is a threat of a radiological event or immediately after it has happened. The second set applies after an event has occurred and a radiation hazard has been identified. This set is divided into those given directly to the public and those given to the first responders and local response agencies. *In any event it is generally best to assume radioactive material is involved until measurements show otherwise.*

In an actual event, as it proceeds and more information is obtained, additional PARs will be developed addressing the more precise needs that become known. Until then, the protective actions described in this document should provide protection of the public with regards to radiological issues.

Introduction

The basis for the decisions and recommendations includes the following assumptions:

- We are only addressing radiological concerns and issues.
- We are dealing with a dirty bomb, not a nuclear detonation.
- We are assuming there is radioactive material in the area. These recommendations will be protective until we find out if that is true or not.
- Calculations have shown us that in these situations the immediate dose levels are not likely to be life threatening outside of the blast area.
- The dose and activity trigger levels (Protective Action Guides) developed for emergency response at nuclear power plants and used for relocation and food control can be applied for these events. In most of the affected areas, dose levels will be much less than the trigger levels and relocation will be unnecessary.
- We are providing information to city, county, and regional agencies and first responders who will be making the first decisions.
- To assure public safety, in most cases, it is unlikely that protective actions will be needed beyond 1 mile from the epicenter of the event.

Three phases were defined for development of PARs:

Phase I Applies immediately and continues until we know more about the event, e.g. having the results from a sample, an instrument reading, and/or a Multi-Channel Analyzer reading (for gamma-emitting radionuclides). These can help us know what the isotope(s) are and what the dose level is. We can then refine the PARs.

Identifying dose levels and radionuclides is vital so getting a sample and/or instrument readings is of utmost importance.

Phase II Event is over in terms of explosion or initial distribution of radioactive material. The radiation hazard has been identified. This is the beginning of the recovery process.

Phase III Cleanup and full recovery. Food control restrictions if necessary following procedures similar to those developed for use after a nuclear power plant event.

Protective Action Recommendations (PAR)

Protective action recommendations should be applied to locations and individuals within 1 mile from event until further information is gathered.

Phase I

An explosion or other event has occurred, e.g. a dirty bomb:

PAR₁ Recognize other threats, such as fire or explosion that immediately impact life, may take precedence over radiation.

PAR₂ Don't deny or delay needed medical attention.

PAR₃ Shelter-in-place. This means to stay inside a building, close the windows, turn off ventilation or turn it on re-circulation if possible. Duct tape and plastic are not necessary unless windows are broken. They could make the building too air tight.

Sheltering-in-place is a temporary measure and normally will last less than 24 hours. During that time safe paths of egress will be determined so people can then leave the area in as safe a manner as possible.

PAR₄ Contamination is not a medical emergency and does not require a visit to the hospital or emergency room. Only seek medical

attention if you have an injury or medical emergency.
Contaminated individuals can go to Public Assistance Centers for aid.

PAR₅ Move away from explosion, for instance to opposite side of building and stay away from windows in case of broken glass.

PAR₆ Listen to the news, via TV or radio – Tune in to your local emergency broadcasting station (Emergency Alert System) for further instructions.

First Responders Only:

PAR₇ Take a sample as soon as possible and send it to the State Public Health Lab. The Lab should recognize that there might be multiple hazards, including chemical, biological or radiological.

Phase II

Once event has happened and a radiation hazard has been identified:

PARS 1-7 apply to this phase as well.

Public Recommendations

PAR₈ If you think you have been contaminated, remove outer layer of clothes, bag them and then take a shower using lukewarm water and plenty of soap. Do not scrub skin.

PAR₉ Public Assistance Centers will be setup as needed and you will be informed by radio/TV of their locations.

PAR₁₀ Do not retrieve vehicles or personal effects that are near the blast scene, especially if they are coated with visible dust from the blast.

PAR₁₁ Do not eat or drink anything that was near the scene, especially items that are not packaged (i.e. fresh fruit, water from open containers, etc.) or food from a home garden.

PAR₁₂ When you reenter your home or workplace after evacuation and if there may be contamination, wear gloves and booties. Remove them when you are back in the clean zone.

PAR₁₃ It is recommended that those who live within the Relocation Area leave their homes until cleanup can be done. If you live outside

the Relocation Area, or if there is no Relocation Area, you need not leave. However, there may still be some contamination in the area and there are several simple things you can do to protect yourself and your family. These include:

- Hosing off car, roof of house, driveway, and sidewalks
- Washing homegrown vegetables to remove all dirt. Any contamination will be removed as well.
- Removing shoes when entering house.

Recommendations to Local Governments/Emergency Responders

- | | |
|-------------------|--|
| PAR ₁₄ | Keep fighting fires. |
| PAR ₁₅ | Be aware radiation is involved – USE YOUR METERS. |
| PAR ₁₆ | Prepare an assistance center for eventual possible evacuation, decontamination and people or individuals going into area (e.g. daycare, pets, etc) and coming back out. |
| PAR ₁₇ | <u>Discontinuance of sheltering</u> requires determining a safe pathway out. This is done by making measurements of contamination and radiation levels and determining the areas that are outside of the plume and not impacted. Egress points need to be selected and staffed by people who understand how to use a radiation detector to survey people. If all areas have been equally impacted, wash down a pathway out before establishing egress stations. |
| PAR ₁₈ | Discourage unnecessary entry into the area; for those who do enter or exit the area, direct them to the assistance center for radiological monitoring and assessment on their way out. Radiation levels do not prohibit necessary movement into the zone. |
| PAR ₁₉ | <p>After the initial event, there will be many reasons for people to reenter the event site, either for retrieving necessary items, or for longer periods such as work, keeping essential services operating, and security patrols. To reenter, the following steps should be taken:</p> <ol style="list-style-type: none">1. Establish access/egress points with radiation monitors. Decontaminate the pathway if possible.2. Give people training so they can be treated as occupational radiation workers. After training, the occupational dose limit of 5 rem can be applied to them. If they receive no training, the limit will be 2 rem.3. Measure the dose rate and establish a stay-time for people reentering. Consider issuing dosimetry if practical or mount |

dosimetry in the facility to be used for future dose assessments and to verify that stay-times are correct.

4. Recognize a decision could be made to increase dose limits if necessary.

Handling wash water used during cleanup is an issue for PAR₂₀, PAR₂₁, and PAR₂₂. One of the recommendations found in EPA 400 7.6.3 (see Reference 5) states that when cleaning surface contamination during emergency situations “Do not waste effort trying to contain contaminated wash water.” This recommendation was made because, in most cases, the levels of contamination would not exceed standards for public health and safety. With this in mind, the following recommendations are made:

- | | |
|-------------------|---|
| PAR ₂₀ | Sewage Treatment Plant Operators may consider bypassing wash water into large bodies of water such as the Puget Sound to reduce exposure to workers and limit contamination of the plant and biosolids. From a radiological standpoint, it is considered safe to do this for wash water used during cleanup of the city after a radiological event. |
| PAR ₂₁ | <u>Opening transportation corridors:</u> Major thoroughfares such as freeways into and out of a city could be used shortly after an event with the following stipulations: <ul style="list-style-type: none">- Assess dose rate and contamination levels on the freeway.- Wash down the freeway if contamination is found.- Block off exits so no traffic can enter the event zone or other areas where there may be contamination. |
| PAR ₂₂ | Ferries can be washed with hoses and, from a radiation perspective, the water can go directly into the Puget Sound. It will be diluted below any health standards. |

Recommendation to First Responders and Emergency Responders

- | | |
|-------------------|--|
| PAR ₂₃ | Use the following dose limits for emergency responders and workers performing emergency services. These limits apply to the sum of dose from external radiation exposure measured by detectors or dosimeters and dose received from inhaling radioactive material. A good rule of thumb is to limit exposure to approximately four fifths of the appropriate dose limit (as read on dosimeters) to leave a cushion for any potential internal exposure. For example, if the value being applied is 25 rem, then discontinue activities when dosimeter says you have received 20 rem. |
|-------------------|--|

Guidance for Emergency Responders*

Dose Limit (rem)	Activity being performed	Limitations or conditions
5	Any	None
10	Protecting valuable property	None
25	Life saving or protection of large populations	None
>25	Life saving or protection of large populations	Persons fully aware of the risks involved use this limit only on a voluntary basis.

*Taken from Table 2-2 of EPA 400-R-92-001 *Manual of Protective Action Guides and Protective Actions for Nuclear Incidents*.

Additional Guidance for Emergency Responders*

Turn-Back dose rate (lifesaving)	200 R/hr
Turn-Back dose	10 rem
Personnel Decontamination trigger level (beta, gamma β, γ)	2 times background
Personnel Decontamination trigger level (alpha α)	Any constant, continuous clicks
(Only applies to an alpha-only detector)	
Personnel Equipment reuse contamination level (beta, gamma β, γ)	1 mR/hr on contact (above this decontaminate the equipment prior to reuse.)

* Taken from references 1,5,6,7,8

References

1. NCRP-138 – *Management of Terrorist Events Involving Radioactive Material*, National Council on Radiation Protection Measurements (2001)
2. FRMAC – *Assessment Manual* DOE/ENV11718-061
3. Energy NW Manual 3.13.3
4. *Disaster Preparedness for Radiology Professionals – Response to Radiological Terrorism* American College of Radiology It can be found at <http://www.astro.org/pdf/GR/disasterprimer.pdf>
5. EPA 400-R-92-001 *Manual of Protective Action Guides and Protective Actions for Nuclear Incidents*, US Environmental Protection Agency (1991)
6. WAC 246-232-140 Schedule D Acceptable Surface Contamination Levels, Washington Administrative Code
7. NCRP Report No. 65 *Management of Persons Accidentally Contaminated with Radionuclides*, National Council on Radiation Protection and Measurements (1979)
8. NIOSH/OSHA/USCG/EPA Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities, US Department of Health and Human Services (1985)
9. NIST *Special Publication 981, Aid for Decontamination of Fire and Rescue Service Protective Clothing and Equipment After Chemical, Biological, and Radiological Exposures*.
10. Websites

<http://www.osti.gov/bridge>

<http://www.nv.doe.gov/programs/frmac/DOCUMENTS.htm>

Contacts

Washington State Department of Health

Debra McBaugh	(360) 236-3251	Debra.McBaugh@doh.wa.gov
Craig Lawrence	(360) 236-3267	Craig.Lawrence@doh.wa.gov
Dick Cowley	(360) 236-3272	Richard.Cowley@doh.wa.gov
Kristen Schwab	(360) 236-3266	Kristen.Schwab@doh.wa.gov

U.S. Environmental Protection Agency

Jerry Leitch	(206) 784-7182	jerryleitch@yahoo.com
Rick Poeton	(206) 553-8633	poeton.rick@epa.gov